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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/035,660	12/28/2001	Choon-Seng Tan	P01-3978	4624

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EXAMINER

PATEL, NIKETA I

ART UNIT	PAPER NUMBER
2182	

DATE MAILED: 10/03/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/035,660

Applicant(s)

TAN ET AL.

Examiner

Niketa I. Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) The invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-7, 9-18 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Sicola et al. U.S. Patent Number: 6,601,187 (hereinafter referred to as “*Sicola*”).
3. **Referring to claim 1**, *Sicola* teaches a method of controlling a failover process in a data storage system including a host, a host bus adapter, a communication fabric including data paths, and standby and active storage controllers, comprising: detecting with the host bus adapter [see figure 3 – elements 308, 103A, 103B, 201, 202, 212, 211 combined together makes a host bus adapter] a failover condition [see column 4 – lines 62-67; column 5 – lines 1-4; column 9 – lines 9-67; column 10 – lines 1-63; column 13 – lines 45-67; column 14 – lines 1-16]; responsive to the detecting, operating the host bus adapter to match the failover condition to a particular failover action in a failover rule set [see column 9 – lines 9-67; column 10 – lines 1-63; column 13 – lines 45-67; column 14 – lines 1-16]; and performing with the host bus adapter the matched failover action [see column 9 – lines 9-67; column 10 – lines 1-63; column 13 – lines 45-67; column 14 – lines 1-16.]

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4. Referring to claim 2, *Sicola* teaches that the detecting, operating, and the failover action performing are completed without acts initiated by the host [see column 4 – lines 62-67; column 5 – lines 1-4.]

5. Referring to claim 3, *Sicola* teaches that the detecting includes identifying a particular failure type and wherein the particular fail over action is selected from an action subset corresponding to the particular failure type [see column 4 – lines 62-67; column 5 – lines 1-4; column 9 – lines 9-67; column 10 – lines 1-63; column 13 – lines 45-67; column 14 – lines 1-16.]

6. Referring to claim 4, *Sicola* teaches that the failure type is selected from the group consisting of inter-controller link down, the active storage controller failed, the standby controller failed, an active path failed, and a standby path failed [see column 4 – lines 62-67; column 5 – lines 1-4; column 9 – lines 9-67; column 10 – lines 1-63; column 13 – lines 45-67; column 14 – lines 1-16.]

7. Referring to claim 5, although *Sicola* teaches to detecting with the host bus adapter a failover condition, *Sicola* is silent about prior to the performing, determining with the host bus adapter if all active paths have failed and if all active paths determined failed, skipping the failover action performing when the host bus adapter determines either all other available paths have failed or a standby path is marked as unusable. However, this feature is deemed to be inherent to the *Sicola* system as lines 9-67 of column 9, lines 1-63 or column 10, lines 45-67 of column 13 and lines 1-16 of column 14 teaches to determine a failover condition and in response to the failover condition rerouting data through an alternate rout. If all the routs have failed then

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the system would not be able reroute the data, therefore it would have to skip the performance of the failover action.

8. **Referring to claim 6**, *Sicola* teaches, further including after the failover action performing, operating the host bus adapter to initiate failback when a controller in a preferred slot is replaced, when the controller in the preferred slot is rebooted, and when unusable paths become usable [see column 5 – lines 15-27.]

9. **Referring to claim 7**, *Sicola* teaches, further including performing load distribution with the host bus adapter between the host and the controllers [see column 5 – lines 15-27; column 7 – lines 65-67; column 8 – lines 1-10.]

10. **Referring to claim 9**, *Sicola* teaches a host bus adapter for managing failover and failback processes [see figure 3 – elements 308, 103A, 103B, 201, 202, 212, 211 combined together makes a host bus adapter] within a data storage system having a host server, a communication fabric [see figure 1 – element 100], at least one active storage controller [see figure 3 – element A1], and at least one standby storage controller [see figure 3 – element B1], comprising: a connector linking the host bus adapter to a processor of the host server [see figure 3 – elements 308, 101] ; a port linking the host bus adapter to the communication fabric configured for transmitting and receiving digital information [see figure 3 – element 107]; and a failover mechanism detecting a redundancy failure in the data storage system and in response, initiating failover actions [see column 4 – lines 62-67; column 5 – lines 1-4; column 9 – lines 9-67; column 10 – lines 1-63; column 13 – lines 45-67; column 14 – lines 1-16.]

11. **Referring to claim 10**, *Sicola* teaches that the failover actions are selected by the failover mechanism from a failover rule set [see column 4 – lines 62-67; column 5 – lines 1-4; column 9 – lines 9-67; column 10 – lines 1-63; column 13 – lines 45-67; column 14 – lines 1-16.]

12. **Referring to claim 11**, *Sicola* teaches that the failover mechanism is further configured to determine at the time of the detecting, operating conditions within the data storage system, to determine whether the operating conditions match a set of failover conditions, and if matching, to select the failover action corresponding to the operating conditions [see column 4 – lines 62-67; column 5 – lines 1-4; column 9 – lines 9-67; column 10 – lines 1-63; column 13 – lines 45-67; column 14 – lines 1-16.]

13. **Referring to claim 12**, *Sicola* teaches that the failover conditions are specific to the detected redundancy failure [see column 4 – lines 62-67; column 5 – lines 1-4; column 9 – lines 9-67; column 10 – lines 1-63; column 13 – lines 45-67; column 14 – lines 1-16.]

14. **Referring to claim 13**, *Sicola* teaches that the failover mechanism presents a single logical unit number (LUN) entity to operating system device drivers in the host processor that is discoverable a plurality of times [see column 6 – lines 42-61; column 8 – lines 50-67; column 9 – lines 1-9] and wherein the failover actions are initiated without prior communication with the host processor [see column 4 – lines 62-67; column 5 – lines 1-4.]

15. **Referring to claim 14**, *Sicola* teaches a data storage system with redundant data storage, comprising: a host computer device with a processor running operating system devices drivers [see figure 3 – element 101]; a communication fabric for carrying digital data signals [see figure 3 – element 103A, 103B]; an active controller controlling access by the host computer device to data storage devices [see figure 3 – elements A1 or A2 or B1 or B2]; a standby controller

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controlling access by the host computer device to the data storage devices [see figure 3 – elements A1 or A2 or B1 or B2]; and a host bus adapter [see figure 3 – elements 308, 103A, 103B, 201, 202, 212, 211 combined together makes a host bus adapter] linked to the host processor and the communication fabric for selecting a path through the communication fabric to one of the active and standby controllers for providing the operating system device drivers with access to the data storage devices, wherein host bus adapter is configured to initiate a failover action selected from a set of failover actions [see column 4 – lines 62-67; column 5 – lines 1-4; column 9 – lines 9-67; column 10 – lines 1-63; column 13 – lines 45-67; column 14 – lines 1-16.]

16. **Referring to claim 15**, *Sicola* teaches that the host bus adapter detects a potential failure in redundancy and determines whether to initiate the failover action by determining whether failover operating circumstances and failover operating conditions for the potential failure are satisfied [see column 4 – lines 62-67; column 5 – lines 1-4; column 9 – lines 9-67; column 10 – lines 1-63; column 13 – lines 45-67; column 14 – lines 1-16.]

17. **Referring to claim 16**, *Sicola* teaches that the failover operating circumstances require when an active path in the communication fabric fails that at least one path to the controllers is available and that a path to the standby controller is usable [see column 4 – lines 62-67; column 5 – lines 1-4; column 9 – lines 9-67; column 10 – lines 1-63; column 13 – lines 45-67; column 14 – lines 1-16.]

18. **Referring to claim 17**, *Sicola* teaches that the initiated failover action is selected from the set of failover actions based on existing ones of the failover operating conditions [see

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column 4 – lines 62-67; column 5 – lines 1-4; column 9 – lines 9-67; column 10 – lines 1-63;
column 13 – lines 45-67; column 14 – lines 1-16.]

19. Referring to claim 18, *Sicola* teaches that the data storage devices are grouped into subsets [see column 7 – lines 7-10] and wherein the host bus adapter is configured to perform the failover action for the subsets when a particular storage device within the subset requires the failover action [see column 4 – lines 62-67; column 5 – lines 1-4; column 9 – lines 9-67; column 10 – lines 1-63; column 13 – lines 45-67; column 14 – lines 1-16.]

20. Referring to claim 20, *Sicola* teaches that the host bus adapter presents a single logical unit number (LUN) entity to each of the operating system device drivers that is discoverable multiple times [see column 6 – lines 42-61; column 8 – lines 50-67; column 9 – lines 1-9.]

Claim Rejections - 35 USC § 103

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

22. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

23. Claims 8 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sicola et al. U.S. Patent Number: 6,601,187 (hereinafter referred to as "*Sicola*".)

24. **Referring to claims 8 and 19**, *Sicola* is silent about enforcing with the host bus adapter anti-thrashing rules comprising preventing the performing from being completed more than set number of times per pre-set monitoring interval.

It would have been obvious to one of ordinary skill in the art at the time of applicant's invention that an anti-thrashing was an old and well-known type of safeguard. It would have been obvious to one of ordinary skill in the art at the time of applicant's invention to implement anti-thrashing safeguard to prevent the system from falling into an endless loop.

Conclusion

25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following documents have been made record of to further show the state of the art as it pertains to a failover detector software module being placed either on the host system or on an intelligent host adapter:

Jantz U.S. Patent Number: 5,944,838

The following documents have been made record of to further show the state of the art as it pertains to anti-threshing:

McAllister et al. U.S. Patent Number: 6,253,288

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The following documents have been made record of to further show the state of the art as it pertains to systems with failover and failback firmware:

Deitz et al. U.S. Patent Number: 6,578,158

Ninomiya et al. U.S. Patent Number: 6,578,100

Duso et al. U.S. Patent Number: 6,625,750

Teachout et al. U.S. Patent Number: 6,574,687


DeKoning et al. U.S. Patent Number: 6,085,333

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Niketa I. Patel whose telephone number is (703) 305 4893. The examiner can normally be reached on M-F 8:00 A.M. to 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey A. Gaffin can be reached on (703) 308 3301. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305 3900.

NP


JEFFREY GAFFIN
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